

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 28 OCT 2004

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Applicant's or agent's file reference 9872	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/GB 03/04220	International filing date (day/month/year) 29.09.2003	Priority date (day/month/year) 07.10.2002
International Patent Classification (IPC) or both national classification and IPC C07C67/05		
Applicant BP CHEMICALS LIMITED et al.		

- This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 6 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of sheets.

- This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 30.04.2004	Date of completion of this report 27.10.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Mercey, J Telephone No. +49 89 2399-8956



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB 03/04220

1. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-14 as originally filed

Claims, Numbers

1-31 as originally filed

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/GB 03/04220**

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	1-31
Inventive step (IS)	Yes: Claims	
	No: Claims	1-31
Industrial applicability (IA)	Yes: Claims	1-31
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

D1 : EP-A-685449

D2 : EP-A-1006100

- 1) The application does not meet the requirements of Articles 5 and 6 PCT, because Claims 1, 2 and 15 are not clear, nor would the invention appear to be disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.
 - 1.1) The phrase "and wherein in said process the catalyst is contacted with the alkene, at a partial pressure, P, optionally in the presence of the carboxylic acid" in Claim 1 renders said claim unclear, since in the first 3 lines of Claim 1 it is specified that the catalyst is contacted with alkene and carboxylic acid. Furthermore, it is not clear at what point in the reaction the reaction temperature and/or partial pressure of the alkene should be reduced. (In any reaction, the pressure pressure of the reactants and the reaction temperature are at some point reduced). No Examples of how the reaction of Claim 1 is to be carried out in practice have been provided.
 - 1.2) Claim 2, which is dependent on Claim 1, specifies that "the outlet stream comprises less than 2 vol% oxygen", whereas it would appear from Claim 1 that this feature is essential. Dependent claims should define only those features over and above the claim(s) on which they depend.
 - 1.3) Claim 15 is unclear, since it defines "A process for the production of alkenyl carboxylate ... characterised in that **where** during the course of said process, the catalyst is contacted with the alkene, optionally in the presence of the carboxylic acid, and in the substantial absence of the molecular oxygen-containing gas, the period of contact, Z, between the catalyst and the alkene, and optional carboxylic acid is insufficient to reduce the catalytic activity by more than 10% of y" (emphasis added). The claim thus does not specify that during the course of said process, the catalyst is contacted with the alkene, optionally in the presence of the carboxylic acid, and in the substantial absence of the molecular oxygen-containing gas, but defines only what should happen when this is the case. It is not specified what should happen in the case when during said process the catalyst is **not** contacted with the alkene, optionally in the presence of the carboxylic acid, and in

the substantial absence of the molecular oxygen-containing gas.

- 2) Furthermore, the above-mentioned lack of clarity notwithstanding, the present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of Claims 1-31 would not appear to be novel in the sense of Article 33(2) PCT.
 - 2.1) According to the Applicant (cf. page 3, lines 28-32), it is usual that during, for example, shut-down, the oxygen concentration in the outlet stream from the reaction zone is below 2vol%. During such a routine shut down, the reaction temperature and partial pressure of alkene are automatically reduced. Thus it cannot be seen how the phrase "reducing the partial pressure of the alkene and/or reducing the reaction temperature" in Claim 1 renders the presently claimed process novel over any standard industrial process for the production of an alkenyl carboxylate from an alkene, a carboxylic acid and a molecular oxygen-containing gas (cf. for example D1/D2).
 - 2.2) Since as indicated in item 1.3 above, Claim 15 embraces "A process for the production of an alkenyl carboxylate in which an alkene, a carboxylic acid and a molecular oxygen-containing gas are contacted in a reaction zone at an elevated temperature, T, in the presence of a catalyst having a catalytic activity y, comprising a Group VIII metal, a promoter and an optional co-promoter", since the characterising portion applies only in the case where during the course of said process, the catalyst is contacted with the alkene, optionally in the presence of the carboxylic acid, and in the substantial absence of the molecular oxygen-containing gas. When this is not the case, there is no characterising portion to the claim and the process is merely a standard process for preparing an alkenyl carboxylate as known, for example, from D1/D2.
- 3) Insofar as any of the presently claimed subject-matter may be novel, it cannot be seen how it involves an inventive step (Article 33(3) PCT).
 - 3.1) Thus in the light of standard industrial processes for the production of an alkenyl carboxylate from an alkene, a carboxylic acid and a molecular oxygen-containing gas (cf. for example D1/D2), the problem to be solved by the present invention would appear to be to avoid loss of catalytic activity on starting-up or restarting of the process (cf. page 2, lines 12-17) and to avoid benzene production at low levels of molecular oxygen (cf. page 2, lines 22-29).

- 3.2) The solution provided by Claim 1 involves "reducing the partial pressure of the alkene and/or reducing the reaction temperature". However, it is not apparent how these features solve the problem, since it cannot be seen how the reaction temperature and/or partial pressure of one of the reactants can be reduced on (re-)starting the reaction. Furthermore, no Examples illustrating how this invention should be carried out have been provided.
- 3.3) It is not even seen what problem is solved by the process of Claim 15. The preamble to said claim is a standard process for preparing alkenyl carboxylates. The claim is then characterised (at least in part; see item 1.3 above) in that the catalyst is contacted with the alkene, optionally in the presence of the carboxylic acid, and in the substantial absence of the molecular oxygen-containing gas (said contacting resulting in deactivation of the catalyst; cf. Figs. 1 & 2), and specifying that the period of contact between the catalyst and the alkene, and optional carboxylic acid is insufficient to reduce the catalytic activity by more than 10%. Thus Claim 15 differs from the state of the art by virtue of a step which deactivates the catalyst by not more than 10%. No inventiveness can be seen in the introduction of such a step, the skilled person having many options open to him in order to deactivate a catalyst.